



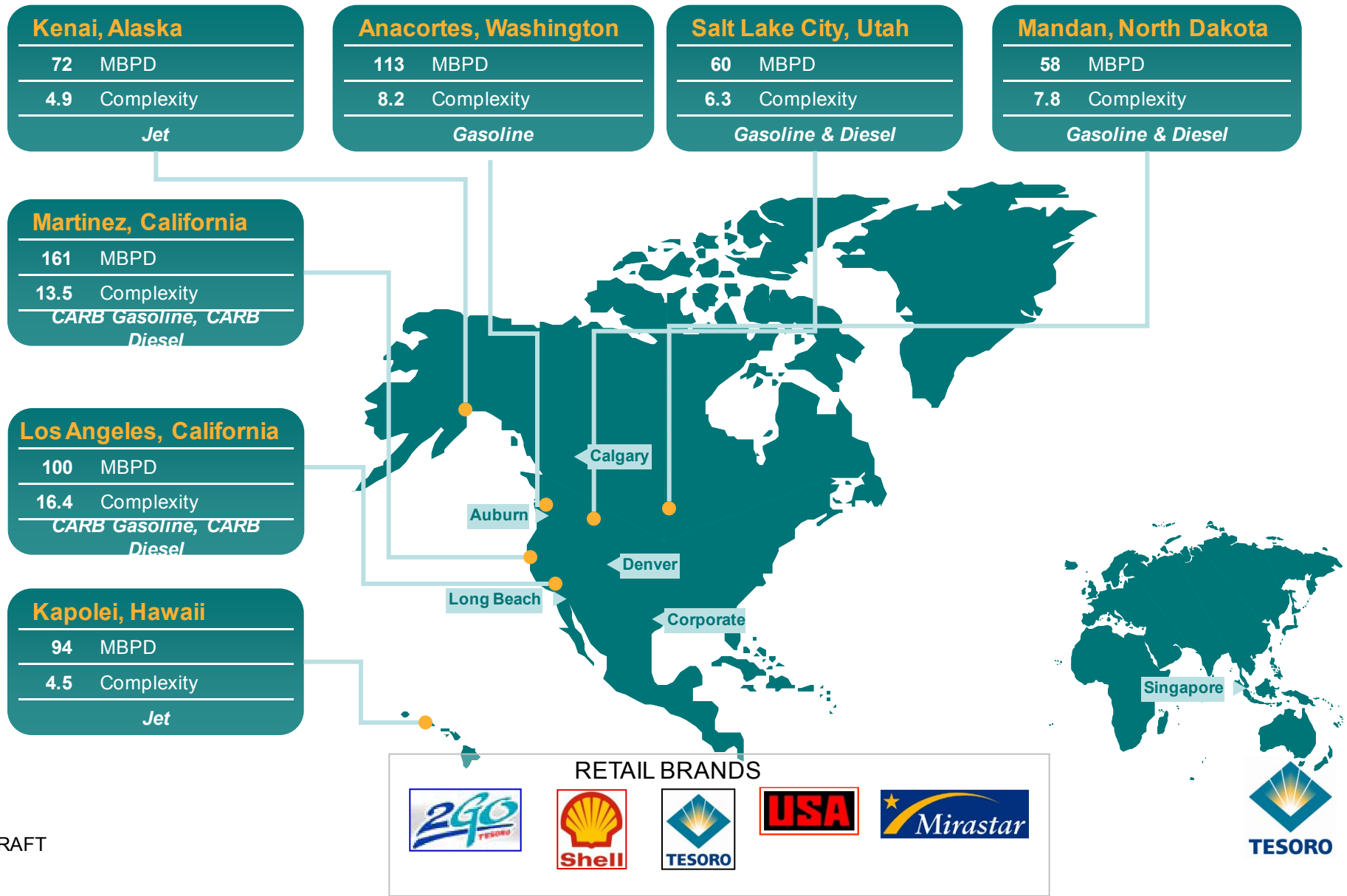
Hawaii Biofuels Production: Opportunities and Challenges

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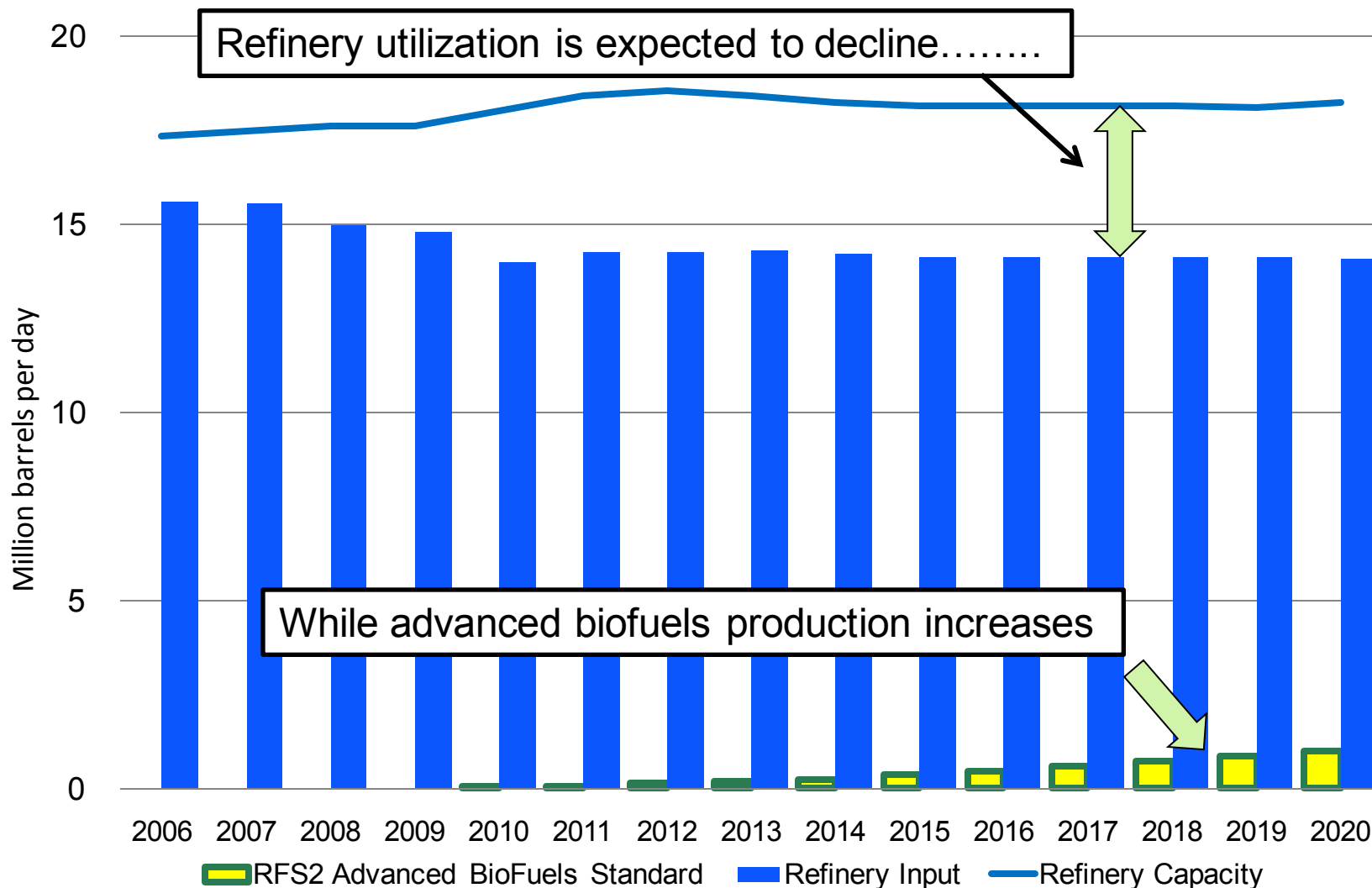
Tesoro Is an Independent Refiner

1



US Refinery Throughput

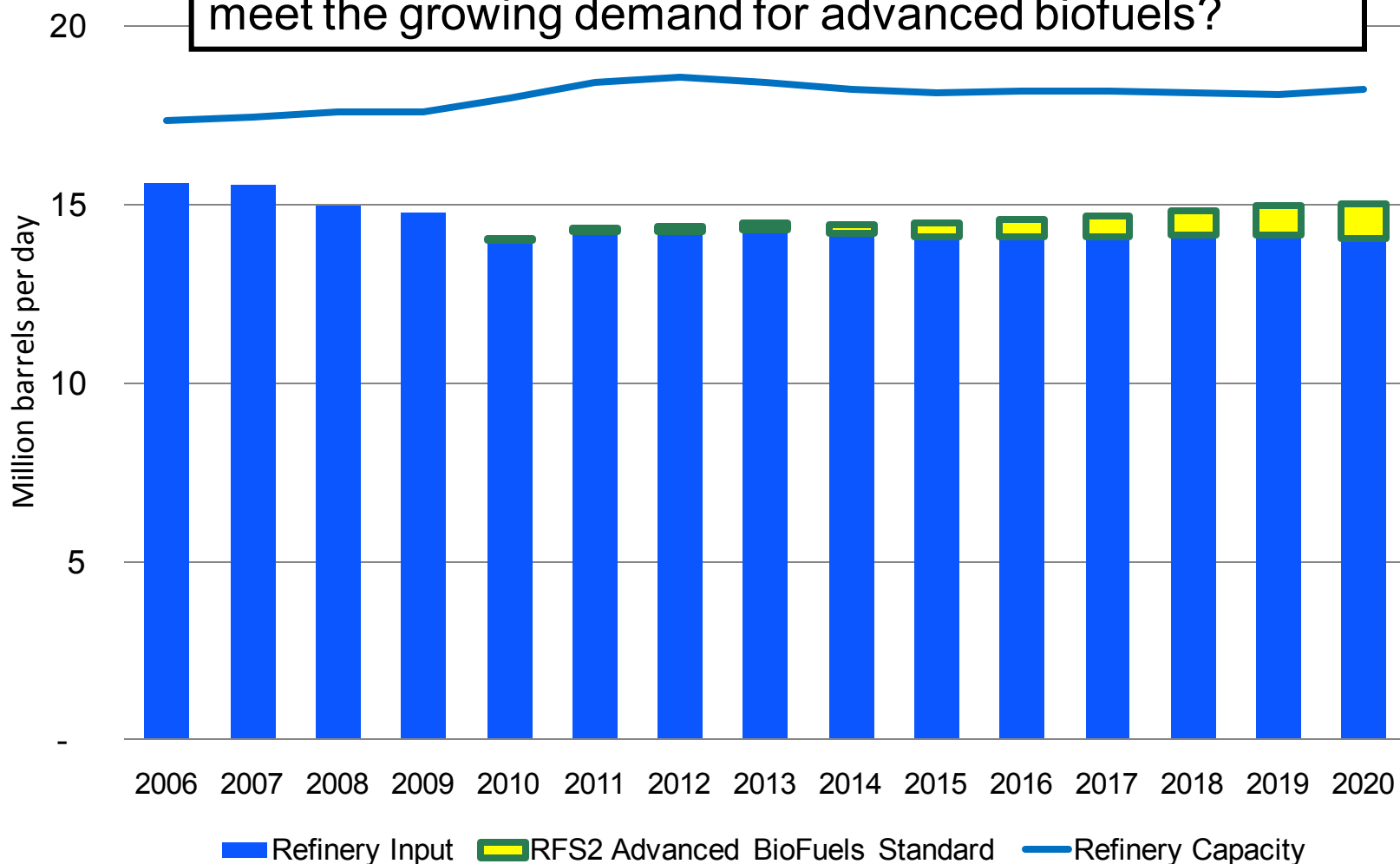
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The Challenge

3

How can we use the existing refining infrastructure to meet the growing demand for advanced biofuels?



Source: EIA March 2009 AEO



Process Routes Depend on Feedstock

Feedstock Type	Sources	Process
Renewable Oils	Algae Jatropha Palm Waste	Hydroprocessing
Ligno-cellulosic	Sugarcane Bagasse Sweet Sorghum Eucalyptus, other trees Grasses Algal Biomass	Pyrolysis

- What comes first?
 - Feedstock development or process technology investment?
- To quickly develop an in-state biofuels industry, both must be develop in parallel

- Tesoro is teaming with Hawaii BioEnergy to jointly evaluate biofuels projects
- Tesoro is supporting the efforts of technology developers
 - Focus on hydroprocessing and pyrolysis routes
 - Envergent (UOP) pyrolysis pilot project to be located adjacent to Tesoro's Kapolei refinery
- Tesoro is a member of the National Advanced Biofuel Consortium
 - Led by National Renewable Energy Laboratory
 - Awarded grant to select technologies which provide the greatest promise to utilize existing refining and distribution infrastructure in the production of renewable fuels
- Tesoro is working with algae producers to support the development of this potential feedstock

- Today, Tesoro must purchase approximately 1 billion gallons of crude oil every year to meet the energy needs of the state of Hawaii
- Tesoro is working toward the development of technologies to allow renewable feedstocks to reduce our dependence upon crude oil to meet Hawaii's increasing needs for renewable energy



Thank you!